IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Johannes BAUR et al.

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Thin-Film LED Comprising a Current-Dispersing For:

Examiner: Group Art:

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INFORMATION DISCLOSURE STATEMENT



Millions of people, like Reinaldo de Souza Santos of the Baré ethnic group in Brazil (shown getting the Sinovac vaccine), are getting COVID-19 vaccine shots, but more vaccines are needed. Some upcoming vaccines may help fill the gap.

EDMAR BARROS/AP PHOTO

By Tina Hesman Saev

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Barely a year after the World Health Organization declared the coronavirus outbreak a pandemic, 11 vaccines worldwide have been granted emergency use authorization or given full approval. Millions of shots are going into arms every day: As of March 19, 410 million people around the world have gotten the jabs.

As mind-boggling as that is, it still falls far short of the need.

Those 11 vaccines "will not be enough to fulfill the global need in the short term," says Esther Krofah, executive director of FasterCures, part of the Milken Institute think tank in Washington, D.C. Of the more than 7 billion people on Earth, only about 1.2 percent of the world's population is now fully vaccinated against the coronavirus. "We need as many vaccines over the finish line as can get through the scientific process," she says.

Help may be on the way. Another 251 COVID-19 vaccines are at some stage of development with 60 far enough along to be tested in people, says Carly Gasca, senior associate at FasterCures.

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Some vaccines are close to the finish line. For example, one made by Novavax of Gaithersburg, Md., may soon request emergency use authorization in the United States and other countries. But vaccines in the pipeline can fail at any stage. Already at least four vaccine candidates have been abandoned, including two from pharmaceutical giant Merck that failed to generate immune responses as strong as those from natural infections. That company is now helping produce Johnson & Johnson's one-dose vaccine (SN: 2/27/21).

Among the hurdles: The already-in-use vaccines have set a high bar. For instance, mRNA vaccines from Moderna and Pfizer have proven to have about 94 to 95 percent efficacy in clinical trials and in real-world situations and may protect against infection and disease after just one shot (SN: 2/26/21). And finding people willing to participate in gold-standard clinical trials in which they might get a placebo instead of a vaccine could be tough, especially in countries where other authorized vaccines are available.

"You have to have something super über-duper special about your product to survive in this environment," says Onyema Ogbuagu, a virologist who heads COVID-19 clinical trials at Yale School of Medicine.

That edge could come from logistics. To be effective, vaccines have to get into people's bodies. So unlike the Pfizer and Moderna shots, vaccines that don't have to be frozen have a better chance of being used in rural or remote areas and places that don't have resources to buy and maintain freezers, Gasca says.

Or an edge could come from an ability to handle emerging variants of the coronavirus that may be more infectious, more deadly or both (SN: 2/5/21). "The variants emerging are changing the landscape of the kind of virus we're fighting now versus the virus that we were fighting in the fall and in the summer," Krofah says. New vaccines may need to combat even more variants.

Here's a closer look at some of the novel ways vaccine makers are approaching these challenges.

COVAXX

How it works: COVAXX designed small pieces of protein, called peptides, from several of the proteins from SARS-CoV-2, the coronavirus that causes COVID-19. Peptides mimic important structures within the coronavirus proteins, including a part of the spike protein used to break into cells. When injected into the body, the lab-made peptides prod the immune system to build antibodies and gear up other immune cells to attack the coronavirus should the vaccinated person encounter it later. (The Dallas-based company is not connected to the similarly named World Health Organization's COVAX program that distributes vaccines to low-income countries.)

How it's different: While other vaccines, including Novavax's candidate, use the entire spike protein, COVAXX has homed in on portions of coronavirus proteins that are important for function and are likely to provoke a reaction from the immune system. The vaccine is stable at refrigerator temperature.

Clinical trial status: The company completed Phase I testing for safety and the ability to rev up the immune system in 60 adults. All of the volunteers made antibodies and had immune cells known as T cells and B cells trained to recognize the coronavirus in the event of future encounters. Participants had only mild side effects, with few people reporting symptoms such as fever and fatique.